

**Eloy Correctional Facilities Complex**  
**Place ID #2019, LTF #65456**  
**Individual Reclaimed Gray Water Permit**

## **I. FACILITY INFORMATION**

### **Name and Location**

Name of Permittee:	CoreCivic Inc.
Mailing Address:	10 Burton Hills Boulevard Nashville, Tennessee 37215
Facility Name and Location:	Eloy Correctional Facilities Complex 1705 E. Hanna Road Eloy, Arizona (Pinal County)

### **Regulatory Status**

The Arizona Department of Environmental Quality (ADEQ) issued an Individual Gray Water Permit #R105946 (LTF #52888) for this facility on April 5, 2011. An application for renewal of the permit was received by ADEQ on February 3, 2017.

### **Facility Description**

This permit authorizes CoreCivic Inc. (herein referred to as “Permittee”), to operate a gray water treatment and reuse program which collects gray water from four correctional facilities at the Eloy Correctional Facilities Complex: the Redrock Correctional Center, the Saguaro Correctional Center, the Eloy Detention Center, and the La Palma Correctional Center. The gray water is filtered and disinfected, and recycled back into the washing machines for reuse.

AquaRecycle laundry gray water recycle systems are installed in the central laundries at the correctional facilities listed above. Each closed-loop system is used to collect the gray water from the washing machine uses to wash inmate linens; the gray water undergoes treatment and is re-routed back into the washing machines for reuse. The gray water is processed through AquaRecycle’s patented laundry wastewater recycling process. The process includes large suspended solids filtration (larger than 100 microns), followed by fine suspended solids filtration (larger than 5 microns), heavy organic adsorption, fine organic adsorption, ultraviolet (UV) disinfection, ozone disinfection, and organic coagulation.

Each detention center is outfitted with different laundry recycle system models from AquaRecycle. The following paragraphs describe each system model.

### **Premium System - La Palma Detention Center**

The CCA La Palma Detention Center installation is utilizing an AquaRecycle Premium system. A process flow diagram of this system is provided in Figure 1 (attached). A description of the main process elements of this system is below.

The gray water from the washing machines discharges into an existing wastewater trench. The gray water from the washing machines does not have chlorine in it as any chlorine within the potable water or the recycled gray water back to the washing machine has been decayed within the washing cycle. The gray water trench in the CCA La Palma laundry facility is large enough to hold discharges from several washers simultaneously.

A process water pump is provided to transfer the gray water directly from the trench to the first step in the laundry water treatment/recycle process - the lint shaker extractor. Two process water pumps are provided; one is required to meet the peak gray water flows while the other pump is provided as a redundant unit. Operation of each pump is cycled to allow for even run times between each pump.

The gray water passes through a vibrating lint removal system to remove all large solids. The screened gray water is then discharged to a "leg tank" while the collected lint is discharged to a bucket for disposal. This leg tank holds the process water until the system requires recycled water. Ozone is circulated in the leg tank below the lint shaker. While the screened gray water is held in the holding tank, ozone is continuously injected to keep the water bacteria free. Ozone also serves as a micro-coagulant; the small bubbles of gas attach to emulsified and free oils, grease, and other hydrocarbons causing them to oxidize and float quickly to the top of the tank. Ozone also serves as a disinfectant and deodorizer, serving to keep the process water bacteria-free and odor-free. Lint that is removed is discharged into a lint bucket. This lint is disposed of into the garbage.

A process pump then pulls the screened gray water out of the leg tank and the pressurized filtration process begins.

The filtration tanks (suspended solids filter and soap, organics, oil and grease filter) are pressurized and controlled by 3-way pneumatic valves that control the flow of process water; either forward (from top to bottom) as in filtration mode, or backward (bottom to top) as the units are backwashed. The suspended solids filters are the first series of filtration. Different types of media filtration are used to trap the smaller suspended solids particles remaining in the gray water. The suspended solids filter will trap all particles greater than 5 microns in size and hold these solids in the media bed until the vessels reach a pre-determined volume or time setting. The system will then automatically backwash the filter by sending recycled gray water at a high flow rate through the bottom of the vessel. This high volume lifts the bed approximately 50 percent and forces all accumulated solids to travel through the top of

the vessel and out as backwash water. This backwash water is then sent directly to the sewer system, bypassing the gray water trenches.

After leaving the suspended solids filter, the gray water travels through a large pressure tank filled with specially formulated media designed to address the various types of gray water in each special environment. The soap, organics, oil and grease filter removes the majority of free and emulsified oils and grease in the gray water as it travels through the filtration process. This same tank allows for the removal of soaps and organics including hydrocarbons, surfactants, toxins, and chemicals accumulated in the washing process. This proprietary blend of specially formulated earth media also remove any odor that may be present in the water.

The soap, organics, oil and grease filter is automatically backwashed once daily as described with the suspended solids pressure filter. However, the backwashing of this vessel is designed to simply “fluff up” and redistribute the media bed to prevent channeling. The backwash discharge does not contain any toxic chemicals. The media serves as an adsorption bed and removes and retains the chemicals and the organics that are removed from the process water. Therefore, the media has a limited life and requires annual replenishment. Backwash water is sent directly to the sewer system.

After leaving the soap, organics, oil and grease filter, the filtered gray water is sent to a final holding tank where it waits for the washing machines to require more water. While the recycled water is held in the holding tank, additional ozone is injected to keep it fresh and clean 24 hours a day. Ozone is injected into the tank with the use of an ozone recirculation pump and ozone venture injector. Chlorine solution is also added into the final holding tank to achieve bacteria inactivation. The chlorine residual in the tank will be sampled by taking a sample from the final holding tank recirculation line.

Water demand is determined and supplied by the use of a pressurized bladder (hydromatic) tank, a 60-40 pressure switch, and a supply pump. As the washing machines need more water, the pressure drops, the pressure switch turns on the supply pump, and the bladder empties as treated gray water is sent to the machines as hot and cold water supply. Potable water is added to the final holding tank automatically when the demand from the gray water tank exceeds the supply rate of recycled gray water.

The gray water in the final holding tank serves primarily as the main supply of water for the washing machines. The secondary purpose is to supply the backwash water needed to periodically clean the pressure vessels. In addition, a fresh water inlet installed in the final holding tank replenishes any lost water. Utilizing this process to backwash the filters, the majority of recycled gray water is replaced with fresh water daily. This process aids in diluting the treated gray water and reduces the possibility of any alkaline or dissolved solids build-up in the water or degradation of the treated gray water.

The sampling of the treated gray water for fecal coliform to verify that the water is meeting the permit requirements will occur on the treated gray water line back to the washing units. The sample location is a sample port located downline from the hydromatic tank as shown in Figure 1 (attached).

The recycle system utilizes a programmable logic computer to run all aspects of the recycle system automatically. It turns on and off, backwashes, tracks the flow rate and total amount of recycled and fresh water replenishment, and serves as the command center for operation of the system. A modem allows AquaRecycle personnel to track the system performance on a daily basis, providing critical access to the system for trouble shooting, software updates, and improvements. The ability to access the system remotely allows AquaRecycle to check system operation and notify the owner/operator of operational changes and improvements.

In-line water quality monitors continuously track the pH and TDS in the recycled gray water. If chemical usage is out of balance or if a malfunction occurs that changes the water quality during the recycle process, the system automatically recognizes the change in quality and fresh water is added until the final recycled water reaches the appropriate quality.

Domestic hot and cold water supply lines are protected from recycled gray water by reduced-pressure-zone backflow preventers.

### **ECO System - Red Rock, Saguaro and Eloy Detention Centers**

AquaRecycle's ECO line of equipment is installed at the CCA Red Rock, Saguaro, and Eloy laundry facilities. The AquaRecycle ECO line was developed to cut costs and size and is better suited for smaller laundries. A process flow diagram of this system is provided in Figure 2 (attached). A description of the main process elements of this system is below.

The gray water from the washing machines discharges into an existing wastewater trench. The gray water from the washing machines does not have chlorine in it as any chlorine within the potable water or the recycled gray water back to the washing machine has been decayed within the washing cycle. The gray water trenches in the CCA Red Rock, Saguaro and Eloy Detention Centers laundry facilities are large enough to hold discharges from several washers simultaneously.

A process water pump is provided to transfer the gray water directly from the trench to the first step in the laundry water treatment/recycle process - the lint shaker extractor. Two process water pumps is provided; only one is required to meet the peak gray water flows, the other pump is provided as a redundant unit. Operation of each pump is cycled to allow for even run times between each pump.

The gray water passes through a vibrating lint removal system to remove all large solids. The screened gray water is then discharged to a "leg tank" while the collected lint is discharged to a bucket for disposal. This leg tank holds the process water until the system requires recycled water. Ozone is circulated in the holding tank below the lint shaker. While the screened gray water is held in the holding tank, ozone is continuously injected to keep the water bacteria free. Ozone also serves as a micro-coagulant; the small bubbles of gas attach to emulsified and free oils, grease, and other hydrocarbons causing them to oxidize and float quickly to the top of the tank. Ozone also serves as a disinfectant and deodorizer, serving to keep the process water bacteria-free and odor-free. Chlorine solution is also added into the

“leg” tank to achieve bacteria inactivation. Lint that is removed is discharged into a lint bucket. This lint is disposed of into the garbage.

A process pump then pulls the screened gray water out of the leg tank and the pressurized filtration process begins.

The filtration tanks are pressurized and controlled by 3-way pneumatic valves that control the flow of process water; either forward (from top to bottom) as in filtration mode, or backward (bottom to top) as the units are backwashed. The suspended solids filters are the first series of filtration. Different types of media filtration are used to trap the smaller suspended solids particles remaining in the gray water. The suspended solids filter will trap all particles greater than 5 microns in size and hold these solids in the media bed until the vessels reach a pre-determined volume or time setting. The system will then automatically backwash the filter by sending recycled gray water at a high flow rate through the bottom of the vessel. This high volume lifts the bed approximately 50 percent and forces all accumulated solids to travel through the top of the vessel and out as backwash water. This backwash water is then sent directly to the sewer system, bypassing the gray water trenches.

After leaving the suspended solids pressure vessels, the gray water travels through a large pressure tank filled with specially formulated media designed to address the various types of gray water in each special environment. The soap, organics, oil and grease filter removes the majority of free and emulsified oils and grease in the gray water as it travels through the filtration process. This same tank allows for the removal of soaps and organics including hydrocarbons, surfactants, toxins, and chemicals accumulated in the washing process. This proprietary blend of specially formulated earth media is also remove any odor that may be present in the water.

The soap, organics, oil and grease filter is automatically backwashed once daily as described with the suspended solids pressure filter. However, the backwashing of this vessel is designed to simply “fluff up” and redistribute the media bed to prevent channeling. The backwash discharge does not contain any toxic chemicals. The media serves as an adsorption bed and removes and retains the chemicals and the organics that are removed from the process water. Therefore, the media has a limited life and requires annual replenishment. Backwash water is sent directly to the sewer system.

The chlorine residual testing for the ECO systems will occur prior to the soap, organics, oil and grease filter, as shown in Figure 2 (attached).

The process does not include a final holding tank as in the Premium Line used at the La Palma Detention Center. The ECO line sends process water directly from the soap and organics filter to the washing machines’ hot water heaters and cold water inlet valves. If the process rate of recycled gray water is inadequate to properly fill the washing machines, a pressure-reducing valve maintains a minimum supply pressure with domestic water.

The sampling of the treated gray water to verify that the water is meeting the permit requirements will occur on the treated gray water line back to the washing units. The sample location for chlorine residual and fecal coliform is shown in Figure 2 (attached).

The recycle system utilizes a programmable logic computer to run all aspects of the recycle system automatically. It turns on and off, backwashes, tracks the flow rate and total amount of recycled and fresh water replenishment, and serves as the command center for operation of the system. A modem allows AquaRecycle personnel to track the system performance on a daily basis, providing critical access to the system for trouble shooting, software updates, and improvements. The ability to access the system remotely allows AquaRecycle to check system operation and notify the owner/operator of operational changes and improvements. In-line water quality monitors continuously track the pH and TDS in the recycled gray water. If chemical usage is out of balance or if a malfunction occurs that changes the water quality during the recycle process, the system automatically recognizes the change in quality and fresh water is added until the final recycled water reaches the appropriate quality.

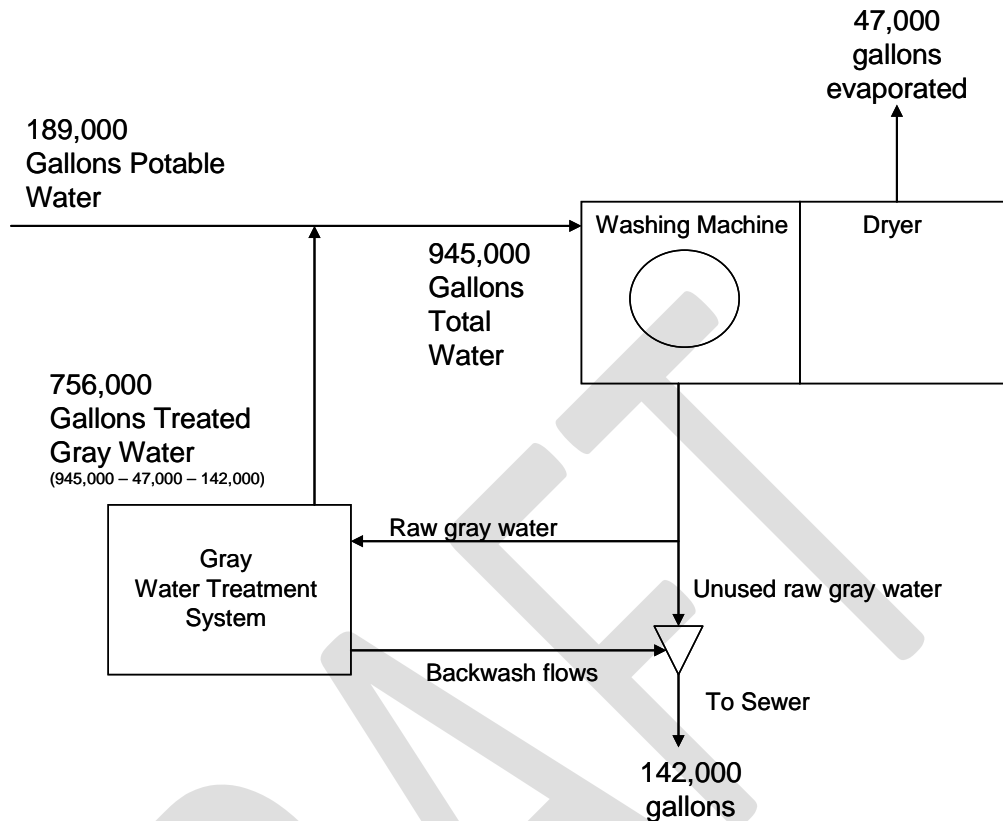
Domestic hot and cold water supply lines are protected from recycled gray water by reduced-pressure-zone backflow preventers.

#### **Recycled Gray Water Balance:**

The typical washer extractor washing machines, like those used at all four CCA laundry facilities, use approximately 2.5 gallons of total water (recycled plus potable) for every pound of linens washed. Approximately five percent of the total amount of water used to wash the linens is carried by the linens from the washing process to the drying process. This water eventually evaporates into the ambient air. Approximately five to ten percent of the gray water discharged by the washing machines is used in the backwashing of the filters. This backwash water is rejected to the sewer system. An additional five to ten percent from La Palma, and 25 to 30 percent from Saguaro, Red Rock, and Eloy overflows from the drain trench to the sewer systems due to differences between washing machine water demand and the ability of the recycle system to supply recycled gray water. The amount of recycled gray water used for washing linens is detailed below:

CCA La Palma Correctional Center uses approximately 945,000 gallons per month to wash inmate linens. The expected recycled gray water usage rate is 80 percent; thus, 756,000 gallons of recycled gray water per month is expected to be used. Approximately 47,000 gallons will evaporate in the dryers and 142,000 gallons will be diverted to the sewer system. The water mass balance for CCA La Palma Correctional Center is demonstrated in Figure 3 below.





**Figure 3. CCA La Palma Correctional Center Laundry Water Balance**

CCA Eloy Detention Center uses approximately 468,000 gallons per month to wash inmate linens. The expected recycled gray water usage rate is 60 percent; thus, 280,800 gallons of recycled gray water per month is expected to be used. Approximately 24,000 gallons will evaporate in the dryers and 163,200 gallons will be diverted to the sewer system.

CCA Red Rock Correctional Center uses approximately 544,000 gallons per month to wash inmate linens. The expected recycled gray water usage is 60 percent; thus, 326,400 gallons of recycled gray water per month is expected to be used. Approximately 27,200 gallons will evaporate in the dryers and 190,400 gallons will be diverted to the sewer system.

CCA Saguaro Correctional Center uses approximately 585,000 gallons per month to wash inmate linens. The expected recycled gray water usage is 60 percent; thus, 351,000 gallons of recycled gray water per month is expected to be used. Approximately 29,300 gallons will evaporate in the dryers and 204,700 gallons will be diverted to the sewer system.

## II. MONITORING AND REPORTING REQUIREMENTS

Routine gray water sampling from each of the four treatment systems is required. The gray water must meet the Class A reclaimed water quality standard for fecal coliform, which is no greater than 23 MPN (most probable number) per 100 ml sample. Chlorine residual shall be monitored on a daily basis and must consistently be greater than or equal to 0.5 mg/L.

## III. ADMINISTRATIVE INFORMATION

### **Public Notice (A.A.C. R18-9-108(A))**

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with respect to a permit or application. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit. This permit was public noticed in a local newspaper after a pre-notice review by the applicant and other affected agencies.

### **Public Comment Period (A.A.C. R18-9-109(A))**

The program rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendars days for interested parties to respond in writing to ADEQ. After closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

### **Public Hearing (A.A.C. R18-9-109(B))**

Not applicable.

## IV. ADDITIONAL INFORMATION

Additional information relating to this proposed permit may be obtained from:

Arizona Department of Environmental Quality  
Water Quality Division - APP Unit  
Attn: Shivani Shah  
1110 W. Washington Street, Mail Code 5415B-3  
Phoenix, Arizona 85007  
Phone: (602) 771-4465